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(54) SKIN ABRASION PREVENTING DEVICE IN A FAT ASPIRATING DEVICE

VORRICHTUNG ZUM VERHINDERN DES HAUTVERSCHLEISSES IN EINER VORRICHTUNG
ZUM ABSAUGEN VON FETT

DISPOSITIF DE PREVENTION DE L'ABRASION DE LA PEAU DANS UN DISPOSITIF
D'ASPIRATION DE GRAISSE

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Description

Field of Invention

The present invention relates to a fat aspirating device according to the preamble of claim 1.

Background Art

As one of the methods to treat severe obesity and adiposis, there is included a method to remove fat per se surgically. The fat aspirating method reported by Louise in 1978, France, in particular, has been distinctly common since the incisions on skin according to the method are relatively small and the method promises a reliable therapeutic effect.

According to the fat aspirating method, there is employed a fat aspirating device (e.g. known from US-A-4,735,605) provided with a metallic fat aspirating tube having an opening in the vicinity of the tip thereof, and with a vacuum aspirating means being connected with the fat aspirating tube and producing a negative pressure.

Fat aspiration is carried out by incising skin at a relatively small size, inserting a fat aspirating tube through the incision into a fatty layer inside a body, and removing fat, through the opening on the vicinity of the tip of the fat aspirating tube, outside the body by means of a vacuum aspirating means. Such fat aspiration is not carried out while fixing a fat aspirating tube at a predetermined position, but the tube is manually operated to make round-trip motion at a rate of approximately 80 to 120 times per minute. One-hour requirement for aspirating fat in belly, for example, forces a fat aspirating tube to make round-trip motion at a rate of about 4800 to 7200 times through the insertion site of the fat aspirating tube, ie. through the incision site.

Accordingly, on the skin on the circumference of the incision site are caused damages such as pressure-induced abrasion, abrasive injury, and abrasion, and the size of the incision site is more enlarged than the initial size thereof for example by a factor of 1.5, leading to severe damage to tissues. Hence, the scar of the incision site is apparently identified and marked after the operation.

Disclosure of the Invention

The object of the present invention is thus to provide a fat aspirating device, capable of performing fat aspiration under the condition to insert a fat aspirating tube while preventing the abrasive injury of skin.

According to the invention, a fat aspirating device comprises a fat aspirating tube having pores in the vicinity of the tip thereof, a fat reservoir means being connected to the fat aspirating tube, a vacuum aspirating means being connected to the fat reservoir means, a device for preventing abrasive injury from skin provided with a pipe to be inserted into a biological body

and to have a bore portion through which a bar-like body is inserted into the biological body, and with a flange to have an aperture being communicated with the bore portion and to be connected with the pipe and face the skin of the biological body when the pipe is inserted into the biological body.

According to the present invention thus structured, the fat aspirating tube to be inserted into a biological body does not directly contact to skin, to protect skin of the biological body and the vicinity thereof, so that even the repetitive round-trip motion of the fat aspirating tube for fat aspiration does not cause abrasive injury on skin.

According to the present invention thus structured, fat aspiration can be carried out while preventing abrasive injury from skin. Hence, the scar on the skin at the incision site after surgery is of a light degree, and the scar is not identified, apparently.

Brief Description of Drawings

Figs. 1 to 7 depict Example 1 according to the present invention;

Fig.1 is a perspective view of a device for preventing abrasive injury from skin in a fat aspirating device;

Fig.2 is a side view of the device for preventing abrasive injury from skin, depicted in Fig.1;

Fig.3 is a front view of the device for preventing abrasive injury from skin, depicted in Fig.1;

Fig.4 is a sectional view depicting the state in which the device for preventing abrasive injury from skin is inserted together with an auxiliary device for insertion through skin into a biological body;

Fig.5 is a perspective view of the state in which the device for preventing abrasive injury from skin, depicted in Fig.1, is fixed on skin by means of thread;

Fig.6 is a view schematically depicting the overall fat aspirating device;

Fig.7 is a sectional view depicting the state in which the fat aspirating tube is inserted through the device for preventing abrasive injury from skin, depicted in Fig.1, into fatty layer inside a biological body to aspirate fat.

Figs.8 to 12 depict Example 2 according to the present invention;

Fig.8 is a perspective view of another device for preventing abrasive injury from skin in a fat aspirating device;

Fig.9 is a side view of the device for preventing abrasive injury from skin, depicted in Fig.8;

Fig.10 is a front view of the device for preventing abrasive injury from skin, depicted in Fig.8;

Fig.11 is a sectional view depicting the state in which the device for preventing abrasive injury from skin, depicted in Fig.8, is inserted together with an

auxiliary device for insertion through skin into a biological body;

Fig.12 is a perspective view of the state in which the device for preventing abrasive injury from skin, depicted in Fig.8, is fixed on skin by means of thread.

Best Mode of Carrying out the Invention

Example 1 is a fat aspirating device, and as is shown in Figs.1 to 3, a device for preventing abrasive injury from skin 7 to be used in the fat aspirating device is provided with a pipe 1 having a bore portion 1a and a flange 2 having flange surfaces 2b, 2c and being connected to the pipe 1. The pipe 1 is connected to the flange surface 2c almost at right angle. The device for preventing abrasive injury from skin 7 comprises the integrally molded pipe 1 and flange 2 from polytetrafluoroethylene (product name; teflon).

A fat aspirating tube 11 is inserted into the bore portion 1a as described hereinafter. The tip of the pipe 1 is through chamfering. An aperture 2a communicating with the bore portion 1a is formed in the flange 2, and through the aperture 2a, the fat aspirating tube 11 is inserted into a biological body. A pair of protrusions 3a facing each other and a similar pair of protrusions 3b are individually placed on 4 corners of the flange 2.

These protrusions 3a, 3b are for controlling the position of the thread for fixing the device for preventing abrasive injury from skin 7 on skin of a biological body, and they may be in configuration of other forms, for example, notch-like form.

Fig.4 depicts an auxiliary device for insertion 5 to readily insert the aforementioned device for preventing abrasive injury from skin 7 into a biological body. The auxiliary device for insertion 5 comprises tip 5a in conical form, an insertion part 5b to be inserted into the bore portion 1a of the pipe 1 of the device for preventing abrasive injury from skin 7, a stopper 5c for controlling the position of the tip 5a when inserted into the bore portion 1a, and a grip 5d to grip the auxiliary device for insertion 5. The auxiliary device for insertion 5 is constructed from integrally molded polytetrafluoroethylene.

The auxiliary device for insertion 5, described above, is used in the state in which the device is inserted into the device for preventing abrasive injury from skin 7 on inserting the pipe 1 into a biological body. The auxiliary device for insertion 5 is inserted from tip 5a into the aperture 2a and the bore portion 1a of the device for preventing abrasive injury from skin 7, so the surface of stopper 5c directly faces the flange surface 2b. The tip 5a is in the state of being exposed outside the tip of the pipe 1 of the device for preventing abrasive injury from skin 7.

The device for preventing abrasive injury from skin 7 with the auxiliary device for insertion 5 being inserted is inserted into a biological body and fixed therein as follows. That is, a relatively small incision is made on skin, and the device for preventing abrasive injury from skin 7

is inserted together with the auxiliary device for insertion 5 through the incision on the skin. As the tip 5a of the auxiliary device for insertion 5 is in conical form, the device for preventing abrasive injury from skin 7 can be extremely easily inserted into a biological body. Owing to the use of the auxiliary device for insertion 5, there is provided greater protection for the tissue in the vicinity of the skin at the insertion site of the device for preventing abrasive injury from skin 7 than in the case without the use thereof.

As shown in Fig. 4, the pipe 1 of the device for preventing abrasive injury from skin 7 should be inserted until the flange surface 2c directly faces the surface of skin 21, so the pipe 1 is embedded inside the biological body almost perpendicularly toward the surface of the skin 21.

After the auxiliary device for insertion 5 is then drawn out from the device for preventing abrasive injury from skin 7, the flange 2 of the device for preventing abrasive injury from skin 7 is fixed at 2 parts by means of thread 20 as shown in Fig.5. The thread 20 is joined together on the flange surface 2b after passing inside the biological body. A pair of protrusions 3a and another pair of protrusions 3b control the position of the thread 20, so that there is no possible removal of the thread from the flange 2.

As shown in Fig.6, the fat aspirating device of the present example comprises, besides the device for preventing abrasive injury from skin 7, a fat aspirating tube 11 to be inserted into a biological body, a bottle 14 to reserve the fat aspirated from inside the biological body, a vacuum aspirating means 15 generating a negative pressure, and flexible tubes 12, 13 for connecting them mutually. There can be employed those conventionally known as the vacuum aspirating means 15.

In the vicinity of its tip to be inserted in a biological body, the fat aspirating tube 11 has pore 11a as shown in Fig. 7, as well as a grip 11b to hold the fat aspirating tube 11 with hands. Pore 11a may be in single or plural number.

A preventing means to prevent the direct absorption of the fat aspirated from inside a biological body into a vacuum aspirating means 15 can be appropriately placed between the bottle 14 and the vacuum aspirating means 15.

According to the fat aspirating device insofar mentioned, the fat aspirating tube 11 as shown in Fig.7 is inserted into the fat layer 22 in a biological body, from the tip having pores 11a through the aperture 2a and the bore portion 1a of the device for preventing abrasive injury from skin 7.

When the vacuum aspirating means 15 initiates operation, the pressure inside the bottle 14 gets negative through a tube 13. Through a tube 12 and a fat aspirating tube 11, the pressure in the vicinity of the pores 11a subsequently gets negative, so that the fat in the vicinity of the pores 11a is aspirated through the pores 11a, passing in the fat aspirating tube 11 and the tube 12, to reach the bottle 14.

The fat aspirating tube 11 makes round-trip motion in the direction of the arrow shown in Fig.7, until the end of the predetermined fat aspiration.

Even after the repeated round-trip motion, the circumference of the dermal incision never directly contacts to the fat aspirating tube 11 on the surface of skin 21 and in the vicinity of the surface, which is different from conventional manners, so that no abrasive injury might be caused on the circumference of the dermal incision.

After the end of fat aspiration, the device for preventing abrasive injury from skin 7 is removed from inside the biological body, and the vulnus of the incised site of the skin is then closed by subcutaneous suture. In some case, tape fixation is just enough with no need of subcutaneous suture. As no abrasive injury is present on the circumference of the incised site of the skin, the vulnus is remarkably cured with a slight degree of scars not apparently identified at the incised site of the skin.

Preferably, the device for preventing abrasive injury from skin 7 in Example 1 is used in the sites with a relatively thick fat layer such as those in abdomen.

As the condition to be considered for selecting materials constituting the device for preventing abrasive injury from skin 7 and an auxiliary device for insertion 5, there can be mentioned the following; no adverse effects on biological bodies, no abrasion due to the round-trip motion of the fat aspirating tube, no abrasion of the fat aspirating device, relative stability toward temperatures, and possibility of integral molding at a low cost and the like. The materials satisfying these conditions are preferable, for example, polytetrafluoroethylene and silicone resin.

Example 2 is a fat aspirating device similar to that in Example 1, and the device for preventing abrasive injury from skin 8 is different in the pipe thereof from the device for preventing abrasive injury from skin 7 shown in Figs. 1 to 3. The identical parts to those of the device for preventing abrasive injury from skin 7 are marked with the same symbols and the explanation thereof is not proposed.

The device for preventing abrasive injury from skin 8 in Example 2 is characterized by the pipe 4 with a bore portion 4a through which a fat aspirating tube 11 can be inserted, being inclined to a flange surface 2c. The slanting angle θ made by the axial direction of the pipe 4 and the flange surface 2c (shown in Fig. 9) can be appropriately determined. Therefore, the device for preventing abrasive injury from skin 8 can be inserted into a biological body, while the pipe 4 thereof is inclined to the dermal surface.

As depicted in Figs.9 and 10, on one side of the flange 2 as the inverse side of the slanting direction of the pipe 4, ie. on the two corners of the flange 2 in the direction with an obtuse angle between the axis of the pipe 4 and the flange surface 2c, there are mounted a pair of protrusions 3a. On the two corners of the flange 2 in the direction with a sharp angle, there are omitted protrusions but there may or may not be mounted pro-

trusions similarly as in Example 1.

The auxiliary device for insertion 6 for the device for preventing abrasive injury from skin 8 is almost identical to the one shown in Fig. 4, but the surface of a stopper 6c directly facing the flange surface 2b as shown in Fig.11 is inclined to the axis of the auxiliary device for insertion 6, correspondingly to the slanting angle θ of the pipe 4 described above. The position of the tip 5a of the auxiliary device for insertion 6 is controlled by the stopper 6c.

After the device for preventing abrasive injury from skin 8 is inserted into a biological body, along with the auxiliary device for insertion 6, the auxiliary device for insertion 6 is drawn out therefrom.

As depicted in Fig.12, the flange 2 of the device for preventing abrasive injury from skin 8 is fixed by means of thread 20.

The device for preventing abrasive injury from skin 8 in Example 2 is used in a fat aspirating device identical to the device in Example 1 as shown in Fig.6, to produce the same effect.

The device for preventing abrasive injury from skin 8 in Example 2 is preferably used in a relatively thin fat layer such as in upper limbs, lower limbs, and gluteal region.

The device for preventing abrasive injury from skin in accordance with the present invention is used not only in the fat aspirating device as has been described above, but also it is appropriately used for example in the case of inserting tubes for laparoscopes.

Industrial applicability

The device for preventing abrasive injury from skin in accordance with the present invention is preferably used in a fat aspirating device to aspirate fat from inside a biological body.

Claims

1. A fat aspirating device comprising:

a fat aspirating tube (11) having at least an opening (11a) in the vicinity of the tip thereof;
a vacuum reservoir means (14) being connected to the fat aspirating tube (11);
a vacuum aspirating means (15) being connected to the fat reservoir means (14); characterized by

a device for preventing abrasive injury to skin (7, 8) being provided with a pipe (1, 4) to be inserted into a biological body and having a bore portion (1a, 4a) through which said fat aspirating tube (11) is inserted into the biological body, and with a flange (2) having an aperture (2a) communicating with the bore portion (1a, 4a) and connected with the pipe (1, 4) and facing

the skin (7, 8) of the biological body when the pipe (1, 4) is inserted into the biological body, wherein said opening (11a) is at least a pore (11a).

2. The device according to claim 1, wherein the flange (2) is provided with a controlling means (3a, 3b) in order to control the position of thread (20) to fix the flange (2) on skin (7, 8) of a biological body. 5
3. The device according to claim 2, wherein the controlling means (3a, 3b) comprises protrusions or notches. 10
4. The device according to claim 1 or 2, further comprising an auxiliary means (5) for insertion being provided with an insertion part (5b) capable of being inserted into the bore portion (1a, 4a) and the aperture (2a), the tip (5a) of the insertion part (5b) in conical form being exposed outside the pipe (1, 4), a stopper (5c) for controlling the position of the tip (5a) by directly facing the flange (2) when the insertion part (5b) is inserted, and a grip (5d). 15
5. The device according to claim 1, wherein the pipe (1, 4) is placed in almost right-angle direction (Fig. 4) to the flange (2). 20
6. The device according to claim 1, wherein the pipe (1, 4) is placed in slanting direction (Fig. 11) to the flange (2). 25
7. The device according to claim 1, wherein the pipe (1, 4) and the flange (2) are integrally molded. 30
8. The device according to claim 7, comprising polytetrafluoroethylene. 35
9. The device according to claim 7, comprising silicone resin. 40
10. The device according to claim 4, wherein the auxiliary means (5) for insertion is integrally molded.
11. The device according to claim 10, wherein the auxiliary means (5) for insertion comprises polytetrafluoroethylene. 45
12. The device according to claim 10, wherein the auxiliary means (5) for insertion comprises silicone resin. 50
13. The device according to any one of claims 1 to 12, wherein said pore (11a) may be in single or plural number. 55

Patentansprüche

1. Fettabsaugvorrichtung mit:

einer in der Nähe ihrer Spitze mindestens eine Öffnung (11a) aufweisenden Fettabsaugröhre (11);

mit der Fettabsaugröhre (11) verbundenen Fettaufnahmemitteln (14), und

Vakuumabsaugmitteln (15), die mit den Fettaufnahmemitteln (14) verbunden sind, gekennzeichnet durch eine Vorrichtung zur Vermeidung von Hautverschleiß (7, 8) mit einem in einen biologischen Körper einführbaren Saugtrichter (1,4), der einen Bohrbereich (1a,4a) aufweist, über den die Fettabsaugröhre (11) in den biologischen Körper eingeführt wird, und

mit einem Flansch (2), der eine mit dem Bohrbereich (1a, 4a) korrespondierende Öffnung (2a) aufweist, und der mit dem Saugtrichter (1,4) verbunden ist sowie in Richtung der Haut (7,8) des biologischen Körpers weist, wenn der Saugtrichter (1,4) in den biologischen Körper eingeführt ist, wobei die Öffnung (11a) mindestens die Größe einer Pore (11a) aufweist.

2. Vorrichtung nach Anspruch 1, bei der der Flansch (2) mit Führungsmitteln (3a, 3b) versehen ist, um die Position eines Fadens (20) zu steuern, über den der Flansch (2) auf der Haut (7,8) des biologischen Körpers fixiert wird.
3. Vorrichtung nach Anspruch 2, bei der die Führungsmittel (3a, 3b) Vorsprünge oder Einkerbungen enthalten.
4. Vorrichtung nach Anspruch 1 oder 2, die ferner Einführungshilfsmittel (5) enthält, mit einem Einführungsbereich (5b), der in den Bohrbereich (1a, 4a) und die Öffnung (2a) einführbar ist, einer konisch ausgebildeten Spitze (5a) des Einführungsbereichs (5b), die außerhalb der Absaugröhre (1,4) verläuft, einem Stopper (5c), der zur Steuerung der Position der Spitze (5a) dient, indem er bei eingeführtem Einführungsbereich (5b) direkt an den Flansch (2) angrenzt, sowie mit einem Griff (5d).
5. Vorrichtung nach Anspruch 1, bei der die Absaugröhre (1,4) senkrecht zum Flansch (2) angeordnet ist (Fig.4).
6. Vorrichtung nach Anspruch 1, bei der die Absaugröhre (1,4) schräg zum Flansch (2) angeordnet ist (Fig.11).
7. Vorrichtung nach Anspruch 1, bei der die Absaugröhre (1,4) und der Flansch (2) eine Einheit bilden.
8. Vorrichtung nach Anspruch 7, in der Polytetrafluoroethylen enthalten ist.
9. Vorrichtung nach Anspruch 7, in der Siliconharz

- enthalten ist.
10. Vorrichtung nach Anspruch 4, bei der die Einführungshilfsmittel (5) einstückig ausgebildet sind. 5
11. Vorrichtung nach Anspruch 10, bei der die Einführungshilfsmittel (5) Polytetrafluoroethylen enthalten.
12. Vorrichtung nach Anspruch 10, bei der die Einführungshilfsmittel (5) Siliconharz enthalten. 10
13. Vorrichtung nach irgendeinem der Ansprüche 1 bis 12, bei der die Pore (11a) einmal oder mehrmals vorhanden ist. 15

Revendications

1. Un dispositif d'aspiration de graisse (pour la liposaspiration) pour la lipaspiration comprenant :

un tube d'aspiration de graisse (11) muni d'au moins un orifice (11a) au voisinage de sa pointe ;
des moyens de réservoir en dépression (14) reliés au tube d'aspiration de graisse (11) ;
des moyens d'aspiration par dépression (15) reliés aux moyens de réservoir en dépression (14) ;

caractérisé en ce qu'il comporte :

un organe destiné à éviter les lésions de la peau par abrasion (7, 8) muni d'un tube (1, 4) destiné à être inséré dans un corps biologique et présentant une partie d'alésage (1a, 4a) au travers de laquelle ledit tube d'aspiration de graisse (11) est inséré dans le corps biologique, et muni d'un flasque (2) présentant une ouverture (2a) communiquant avec la partie d'alésage (1a, 4a) et reliée au tube (1, 4) et faisant face à la peau (7, 8) du corps biologique lorsque le tube (1, 4) est inséré dans le corps biologique, ledit orifice (11a) étant au moins un pore (11a). 35 40 45

2. Le dispositif selon la revendication 1, dans lequel le flasque (2) est muni de moyens de contrôle (3a, 3b) afin de contrôler la position du fil (20) servant à fixer la flasque (2) sur la peau (7, 8) d'un corps biologique. 50
3. Le dispositif selon la revendication 2, dans lequel les moyens de contrôle (3a, 3b) comprennent des saillies ou des encoches. 55
4. Le dispositif selon la revendication 1 ou la revendication 2, comprenant en outre des moyens auxiliaires (5) pour l'insertion comprenant une partie

d'insertion (5b) susceptible d'être insérée dans la partie d'alésage (1a, 4a) et dans l'ouverture (2a), la pointe (5a) de la partie d'insertion de forme conique (5b) étant exposée à l'extérieur du tube (1, 4), une butée (5c) destinée à contrôler la position de la pointe (5a) en venant directement en face de la collerette (2) lorsque la partie d'insertion (5b) est insérée, et un manche (5d).

5. Le dispositif selon la revendication 1, dans lequel le tube (1, 4) est placé pratiquement à angle droit (figure 4) par rapport au flasque (2).
6. Le dispositif selon la revendication 1, dans lequel le tube (1, 4) est placé dans une direction inclinée (figure 11) par rapport au flasque (2).
7. Le dispositif selon la revendication 1, dans lequel le tube (1, 4) et la collerette (2) sont moulés d'un seul tenant. 20
8. Le dispositif selon la revendication 7, comprenant du polytétrafluoréthylène.
9. Le dispositif selon la revendication 7, comprenant de la résine silicone. 25
10. Le dispositif selon la revendication 4, dans lequel les moyens auxiliaires (5) pour l'insertion sont moulés d'un seul tenant. 30
11. Le dispositif selon la revendication 10, dans lequel les moyens auxiliaires (5) pour l'insertion comprennent du polytétrafluoréthylène.
12. Le dispositif selon la revendication 10, dans lequel les moyens auxiliaires (5) pour l'insertion comprennent de la résine silicone.
13. Le dispositif selon l'une quelconque des revendications 1 à 12, dans lequel ledit pore (11a) peut être unique ou au nombre de plusieurs. 40 45

FIG. 1

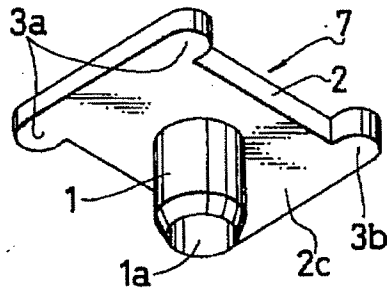


FIG. 2

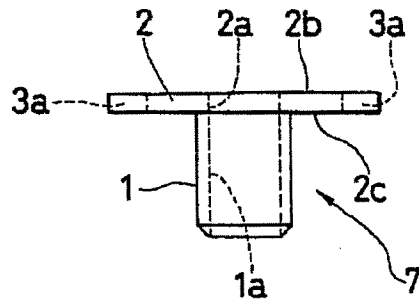


FIG. 3

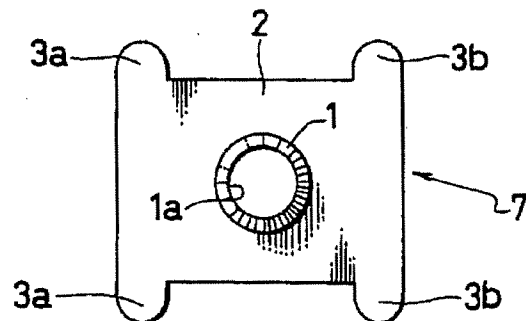


FIG. 4

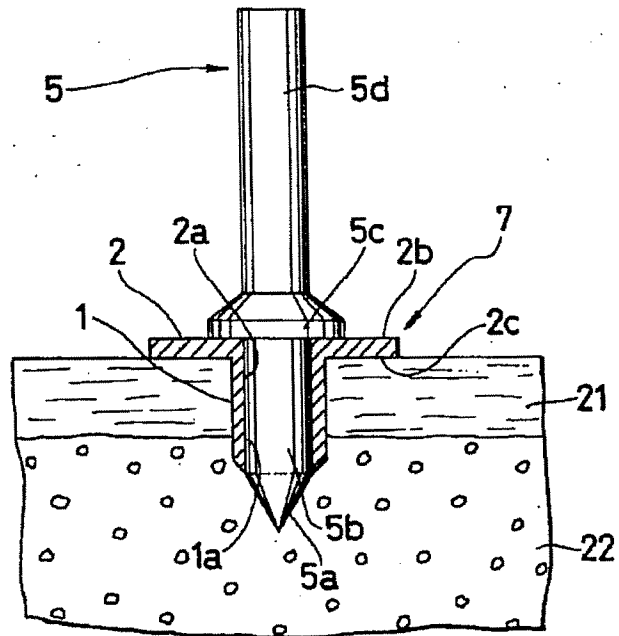


FIG. 11

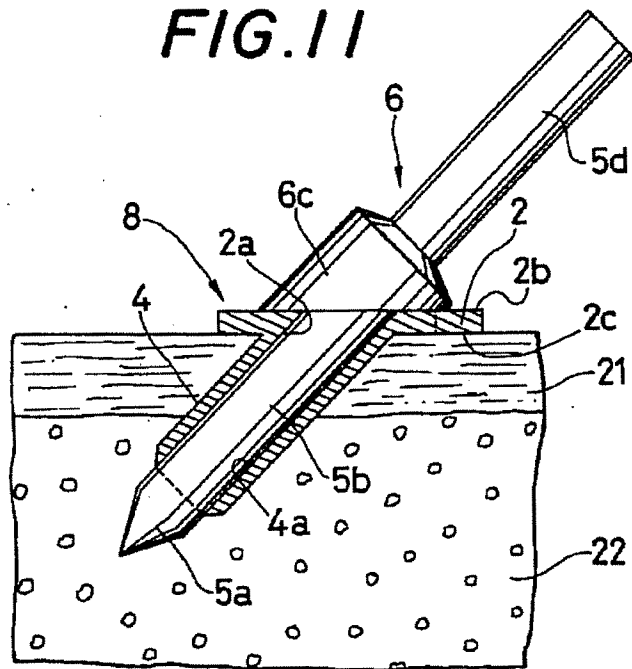


FIG. 5

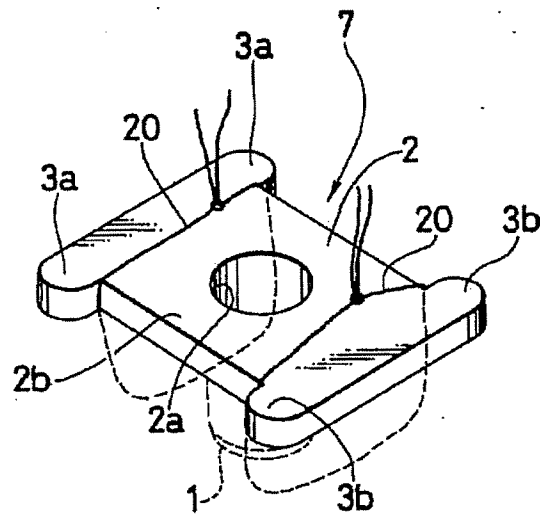


FIG. 12

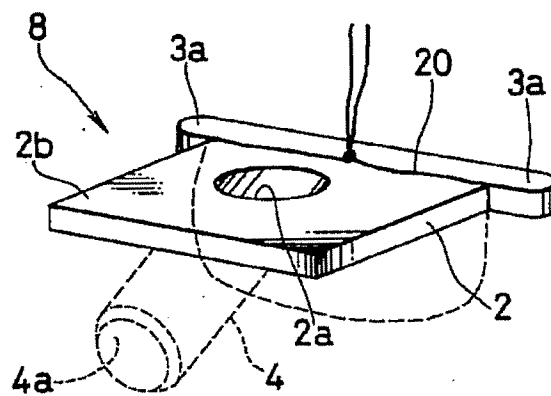


FIG. 6

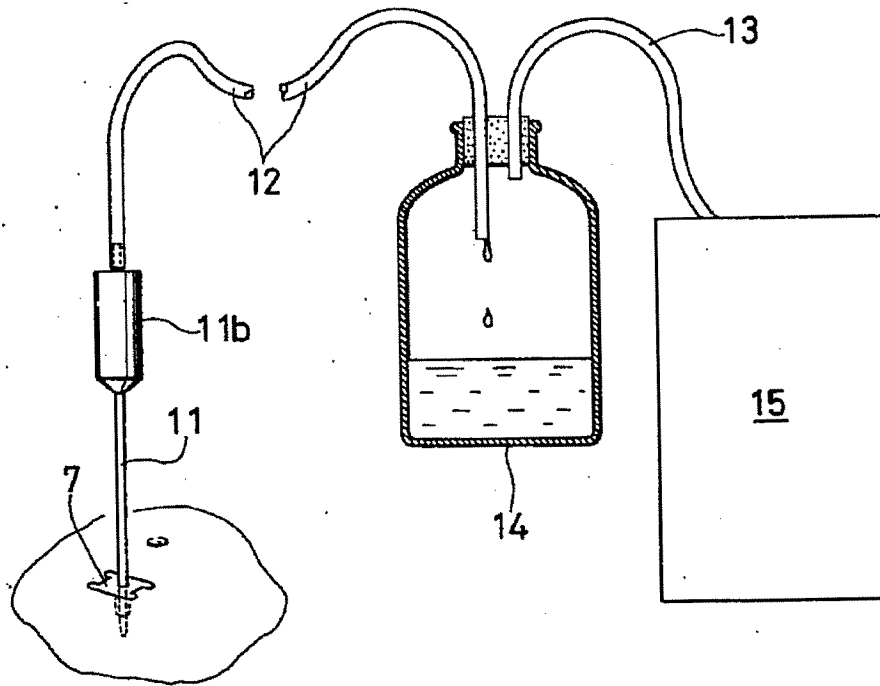


FIG. 7

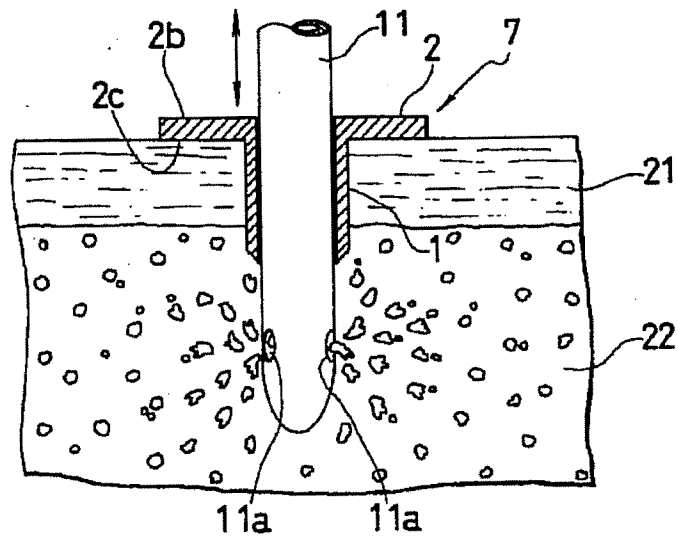


FIG. 8

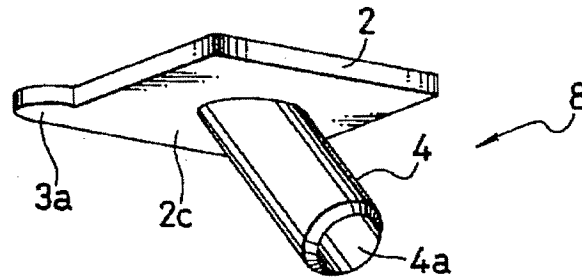


FIG. 9

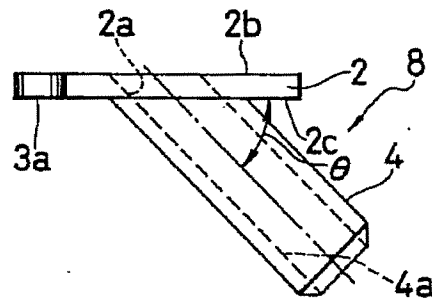


FIG. 10

